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<110>  Colgan, Terence J.
       Siu, K.W. Michael
       Romaschin, Alexander D.
       Yang, Eric C.C.

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Glu Pro Glu Leu Val Tyr Glu Asp Leu Arg Gly Ser Val Thr Phe His
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Cys Ala Leu Gly Pro Glu Val Ala Asn Val Ala Lys Phe Leu Cys Arg
            260                 265                 270

Gln Ser Ser Gly Glu Asn Cys Asp Val Val Val Asn Thr Leu Gly Lys
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Arg Ala Pro Ala Phe Glu Gly Arg Ile Leu Leu Asn Pro Gln Asp Lys
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Asp Gly Ser Phe Ser Val Val Ile Thr Gly Leu Arg Lys Glu Asp Ala
305                 310                 315                 320

Gly Arg Tyr Leu Cys Gly Ala His Ser Asp Gly Gln Leu Gln Glu Gly
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Ser Pro Ile Gln Ala Trp Gln Leu Phe Val Asn Glu Glu Ser Thr Ile
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Pro Arg Ser Pro Thr Val Val Lys Gly Val Ala Gly Ser Ser Val Ala

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Val Leu Cys Pro Tyr Asn Arg Lys Glu Ser Lys Ser Ile Lys Tyr Trp
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Cys Leu Trp Glu Gly Ala Gln Asn Gly Arg Cys Pro Leu Leu Val Asp
385             390             395             400

Ser Glu Gly Trp Val Lys Ala Gln Tyr Glu Gly Arg Leu Ser Leu Leu
                405             410             415

Glu Glu Pro Gly Asn Gly Thr Phe Thr Val Ile Leu Asn Gln Leu Thr
            420             425             430

Ser Arg Asp Ala Gly Phe Tyr Trp Cys Leu Thr Asn Gly Asp Thr Leu
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Trp Arg Thr Thr Val Glu Ile Lys Ile Ile Glu Gly Glu Pro Asn Leu
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Lys Val Pro Gly Asn Val Thr Ala Val Leu Gly Glu Thr Leu Lys Val
465             470             475             480

Pro Cys His Phe Pro Cys Lys Phe Ser Ser Tyr Glu Lys Tyr Trp Cys
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Pro Ser Lys Ala Phe Val Asn Cys Asp Glu Asn Ser Arg Leu Val Ser
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Leu Thr Leu Asn Leu Val Thr Arg Ala Asp Glu Gly Trp Tyr Trp Cys
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Gly Val Lys Gln Gly His Phe Tyr Gly Glu Thr Ala Ala Val Tyr Val
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Ala Val Glu Glu Arg Lys Ala Ala Gly Ser Arg Asp Val Ser Leu Ala
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Lys Ala Asp Ala Ala Pro Asp Glu Lys Val Leu Asp Ser Gly Phe Arg
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Glu Ile Glu Asn Lys Ala Ile Gln Asp Pro Arg Leu Phe Ala Glu Glu
        595             600             605

Lys Ala Val Ala Asp Thr Arg Asp Gln Ala Asp Gly Ser Arg Ala Ser
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Val Asp Ser Gly Ser Ser Glu Glu Gln Gly Gly Ser Ser Arg Ala Leu
625             630             635             640

Val Ser Thr Leu Val Pro Leu Gly Leu Val Leu Ala Val Gly Ala Val
            645             650             655

Ala Val Gly Val Ala Arg Ala Arg His Arg Lys Asn Val Asp Arg Val
        660             665             670

Ser Ile Arg Ser Tyr Arg Thr Asp Ile Ser Met Ser Asp Phe Glu Asn
        675             680             685

Ser Arg Glu Phe Gly Ala Asn Asp Asn Met Gly Ala Ser Ser Ile Thr
    690             695             700

Gln Glu Thr Ser Leu Gly Gly Lys Glu Glu Phe Val Ala Thr Thr Glu
705             710             715             720

Ser Thr Thr Glu Thr Lys Glu Pro Lys Lys Ala Lys Arg Ser Ser Lys
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Page 13

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Ala Val Asp Glu Leu Gly Lys Val Leu Thr Pro Thr Gln Val Lys Asn
            35              40                  45

Arg Pro Thr Ser Ile Ser Trp Asp Gly Leu Asp Ser Gly Lys Leu Tyr
        50              55                  60

Thr Leu Val Leu Thr Asp Pro Asp Ala Pro Ser Arg Lys Asp Pro Lys
65                  70                  75                  80

Tyr Arg Glu Trp His His Phe Leu Val Val Asn Met Lys Gly Asn Asp
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Ile Ser Ser Gly Thr Val Leu Ser Asp Tyr Val Gly Ser Gly Pro Pro
            100                 105                 110

Lys Gly Thr Gly Leu His Arg Tyr Val Trp Leu Val Tyr Glu Gln Asp
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Arg Pro Leu Lys Cys Asp Glu Pro Ile Leu Ser Asn Arg Ser Gly Asp
        130                 135                 140

His Arg Gly Lys Phe Lys Val Ala Ser Phe Arg Lys Lys Tyr Glu Leu
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Lys Leu Glu Gly Leu Thr Asp Glu Phe Glu Glu Leu Glu Phe Leu Ser
        35                  40                  45

Thr Ile Asn Val Gly Leu Thr Ser Ile Ala Asn Leu Pro Lys Leu Asn
    50                  55                  60

Lys Leu Lys Lys Leu Glu Leu Ser Asp Asn Arg Val Ser Gly Gly Leu
65                  70                  75                  80

Glu Val Leu Ala Glu Lys Cys Pro Asn Leu Thr His Leu Asn Leu Ser
            85                  90                  95

Gly Asn Lys Ile Lys Asp Leu Ser Thr Ile Glu Pro Leu Lys Lys Leu
            100                 105                 110

Glu Asn Leu Lys Ser Leu Asp Leu Phe Asn Cys Glu Val Thr Asn Leu
        115                 120                 125

Asn Asp Tyr Arg Glu Asn Val Phe Lys Leu Leu Pro Gln Leu Thr Tyr
    130                 135                 140

Leu Asp Gly Tyr Asp Arg Asp Asp Lys Glu Ala Pro Asp Ser Asp Ala
145                 150                 155                 160

Glu Gly Tyr Val Glu Gly Leu Asp Asp Glu Glu Glu Asp Glu Asp Glu
            165                 170                 175

Glu Glu Tyr Asp Glu Asp Ala Gln Val Val Glu Asp Glu Glu Asp Glu
            180                 185                 190

Asp Glu Glu Glu Glu Gly Glu Glu Glu Asp Val Ser Gly Glu Glu Glu
            195                 200                 205

Glu Asp Glu Glu Gly Tyr Asn Asp Gly Glu Val Asp Asp Glu Glu Asp
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Glu Glu Glu Leu Gly Glu Glu Glu Arg Gly Gln Lys Arg Lys Arg Glu
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Asn Asp Gln Gly Asn Arg Thr Thr Pro Ser Tyr Val Ala Phe Thr Asp
            35                  40                  45

Thr Glu Arg Leu Val Gly Asp Ala Ala Lys Ser Gln Ala Ala Leu Asn
    50                  55                  60

Pro His Asn Thr Val Phe Asp Ala Lys Arg Leu Ile Gly Arg Lys Phe
65                  70                  75                  80

Ala Asp Thr Thr Val Gln Ser Asp Met Lys His Trp Pro Phe Arg Val
            85                  90                  95

Val Ser Glu Gly Gly Lys Pro Lys Val Arg Val Cys Tyr Arg Gly Glu
            100                 105                 110

Asp Lys Thr Phe Tyr Pro Glu Glu Ile Ser Ser Met Val Leu Ser Lys
        115                 120                 125

Met Lys Glu Thr Ala Glu Ala Tyr Leu Gly Gln Pro Val Lys His Ala
    130                 135                 140

Val Ile Thr Val Pro Ala Tyr Phe Asn Asp Ser Gln Arg Gln Ala Thr
145                 150                 155                 160

Lys Asp Ala Gly Ala Ile Ala Gly Leu Asn Val Leu Arg Ile Ile Asn
            165                 170                 175

Glu Pro Thr Ala Ala Ala Ile Ala Tyr Gly Leu Asp Arg Arg Gly Ala
            180                 185                 190

Gly Glu Arg Asn Val Leu Ile Phe Asp Leu Gly Gly Gly Thr Phe Asp
            195                 200                 205

Val Ser Val Leu Ser Ile Asp Ala Gly Val Phe Glu Val Lys Ala Thr
    210                 215                 220

Ala Gly Asp Thr His Leu Gly Gly Glu Asp Phe Asp Asn Arg Leu Val
225                 230                 235                 240

Asn His Phe Met Glu Glu Phe Arg Arg Lys His Gly Lys Asp Leu Ser
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Gly Asn Lys Arg Ala Leu Arg Arg Leu Arg Thr Ala Cys Glu Arg Ala
        260                 265                 270

Lys Arg Thr Leu Ser Ser Ser Thr Gln Ala Thr Leu Glu Ile Asp Ser
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Leu Phe Glu Gly Val Asp Phe Tyr Thr Ser Ile Thr Arg Ala Arg Phe
    290                 295                 300

Glu Glu Leu Cys Ser Asp Leu Phe Arg Ser Thr Leu Glu Pro Val Glu
305                 310                 315                 320

Lys Ala Leu Arg Asp Ala Lys Leu Asp Lys Ala Gln Ile His Asp Val
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Val Leu Val Gly Gly Ser Thr Arg Ile Pro Lys Val Gln Lys Leu Leu
                340                 345                 350

Gln Asp Phe Phe Asn Gly Lys Glu Leu Asn Lys Ser Ile Asn Pro Asp
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Glu Ala Val Ala Tyr Gly Ala Ala Val Gln Ala Ala Val Leu Met Gly
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Asp Lys Cys Glu Lys Val Gln Asp Leu Leu Leu Leu Asp Val Ala Pro
385                 390                 395                 400

Leu Ser Leu Gly Leu Glu Thr Ala Gly Gly Val Met Thr Thr Leu Ile
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Gln Arg Asn Ala Thr Ile Pro Thr Lys Gln Thr Gln Thr Phe Thr Thr
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Arg Ala Met Thr Lys Asp Asn Asn Leu Leu Gly Arg Phe Glu Leu Ser
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465                 470                 475                 480

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                485                 490                 495

Thr Gly Lys Ala Asn Lys Ile Thr Ile Thr Asn Asp Lys Gly Arg Leu
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Ala Glu Asp Glu Ala Gln Arg Asp Arg Val Ala Ala Lys Asn Ser Leu
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Glu Ala His Val Phe His Val Lys Gly Ser Leu Gln Glu Glu Ser Leu
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Arg Asp Lys Ile Pro Glu Glu Asp Arg Arg Lys Met Gln Asp Lys Cys
                565                    570                575

Arg Glu Val Leu Ala Trp Leu Glu His Asn Gln Leu Ala Glu Lys Glu
            580                    585                590

Glu Tyr Glu His Gln Lys Arg Glu Leu Glu Gln Ile Cys Arg Pro Ile
        595                    600                605

Phe Ser Arg Leu Tyr Gly Gly Pro Gly Val Pro Gly Gly Ser Ser Cys
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Gly Thr Gln Ala Arg Gln Gly Asp Pro Ser Thr Gly Pro Ile Ile Glu
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Ala Phe Thr Lys Asn Gln Lys Asp Pro Gly Val Leu Asp Arg Met Met
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Gln Asn Cys Tyr Lys Val Thr Asn Gly Ala Phe Thr Gly Glu Ile Ser
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Val Thr His Lys Pro Asn Ala Ile Gln Met Ala Leu Ser Val Cys Glu
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Asp Leu Ile Ser Ser Gln Val Tyr Ala Ile Leu Val Ser His Pro Pro
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Thr Pro Asn Asp His Phe Thr Pro Thr Pro Val Ser Tyr Thr Ala Gly
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Phe Tyr Arg Ile Pro Val Leu Gly Leu Thr Thr Arg Met Ser Ile Tyr
        115             120             125


Ser Asp Lys Ser Ile His Leu Ser Phe Leu Arg Thr Val Pro Pro Tyr
    130             135             140


Ser His Gln Ser Ser Val Trp Phe Glu Met Met Arg Val Tyr Ser Trp
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Asn His Ile Ile Leu Leu Val Ser Asp Asp His Glu Gly Arg Ala Ala
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Gln Lys Arg Leu Glu Thr Leu Leu Glu Glu Arg Glu Ser Lys Ala Glu
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Lys Val Leu Gln Phe Asp Pro Gly Thr Lys Asn Val Thr Ala Leu Leu
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Ala Gln Ala Val His Glu Leu Leu Glu Lys Glu Asn Ile Thr Asp Pro
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Pro Arg Gly Cys Val Gly Asn Thr Asn Ile Trp Lys Thr Gly Pro Leu
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Ile Met Asn Leu Gln Asn Arg Lys Leu Val Gln Val Gly Ile Tyr Asn
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Gly Thr His Val Ile Pro Asn Asp Arg Lys Ile Ile Trp Pro Gly Gly
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Glu Thr Glu Lys Pro Arg Gly Tyr Gln Met Ser Thr Arg Leu Lys Ile
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Val Thr Ile His Gln Glu Pro Phe Val Tyr Val Lys Pro Thr Leu Ser
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Phe Ser Lys Pro Phe Lys Tyr Gln Gly Leu Thr Ile Leu Val Lys Lys
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Thr Leu Trp Leu Leu Val Gly Leu Ser Val His Val Val Ala Val Met
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Phe Ser Trp Gly Val Leu Leu Asn Ser Gly Ile Gly Glu Gly Ala Pro
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His Met Glu Lys His Asn Tyr Glu Ser Ala Ala Glu Ala Ile Gln Ala
705              710              715              720

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Page 35

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Gln Leu Ala Phe Ala Ala Val Asn Val Trp Arg Lys Asn Leu Gln Asp
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Arg Lys Ser Gly Arg Ala Glu Pro Asp Pro Lys Lys Lys Ala Thr Phe
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Arg Ala Ile Thr Ser Thr Leu Ala Ser Ser Phe Lys Arg Arg Arg Ser
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Ser Lys Asp Thr Ser Thr Gly Gly Gly Arg Gly Ala Leu Gln Asn Gln
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Leu Ala His Gln Ser Asn Ser Thr Asn Ile Phe Phe Ser Pro Val Ser
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Ile Ala Thr Ala Phe Ala Met Leu Ser Leu Gly Thr Lys Ala Asp Thr
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His Asp Glu Ile Leu Glu Gly Leu Asn Phe Asn Leu Thr Glu Ile Pro
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Glu Ala Gln Ile His Glu Gly Phe Gln Glu Leu Leu Arg Thr Leu Asn
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Ser Glu Gly Leu Lys Leu Val Asp Lys Phe Leu Glu Asp Val Lys Lys
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Leu Tyr His Ser Glu Ala Phe Thr Val Asn Phe Gly Asp Thr Glu Glu
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Ala Lys Lys Gln Ile Asn Asp Tyr Val Glu Lys Gly Thr Gln Gly Lys
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Thr Ala Ile Phe Phe Leu Pro Asp Glu Gly Lys Leu Gln His Leu Glu
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Tyr Asp Leu Lys Ser Val Leu Gly Gln Leu Gly Ile Thr Lys Val Phe
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Ser Asn Gly Ala Asp Leu Ser Gly Val Thr Glu Glu Ala Pro Leu Lys
            340             345             350

Leu Ser Lys Ala Val His Lys Ala Val Leu Thr Ile Asp Glu Lys Gly
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Thr Glu Ala Ala Gly Ala Met Phe Leu Glu Ala Ile Pro Met Ser Ile
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Pro Pro Glu Val Lys Phe Asn Lys Pro Phe Val Phe Leu Met Ile Glu
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Gly Ala Lys Ile Asp Ala Ser Lys Asn Glu Glu Asp Glu Gly His Ser
65                  70                  75                  80


Asn Ser Ser Pro Arg His Ser Glu Ala Ala Thr Ala Gln Arg Glu Glu
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His Glu Glu Asp Arg Gly Lys Tyr Thr Cys Glu Ala Thr Asn Gly Ser
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Pro Lys Phe Ala Thr Lys Leu Gly Arg Val Val Val Lys Glu Gly Gln
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Met Gly Arg Phe Ser Cys Lys Ile Thr Gly Arg Pro Gln Pro Gln Val
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Thr Trp Leu Lys Gly Asn Val Pro Leu Gln Pro Ser Ala Arg Val Ser
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Val Ser Glu Lys Asn Gly Met Gln Val Leu Glu Ile His Gly Val Asn
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Gln Asp Asp Val Gly Val Tyr Thr Cys Leu Val Val Asn Gly Ser Gly
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Asn Arg Ser Phe Val Arg Glu Thr Lys Ala Thr Asn Ser Asp Val Arg
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Lys Leu Glu Ser Cys Lys Asp Ser Pro Arg Thr Ala Pro Gln Thr Pro
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Val Leu Gln Lys Thr Ser Ser Ser Ile Thr Leu Gln Ala Ala Arg Val
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Gln Pro Glu Pro Arg Ala Pro Gly Leu Gly Val Leu Ser Pro Ser Gly
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Glu Glu Arg Lys Arg Pro Ala Pro Pro Arg Pro Ala Thr Phe Pro Thr
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Ser Val Leu Lys Asp Cys Ala Val Ile Glu Gly Gln Asp Phe Val Leu
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Ala Glu Leu His Ile Gln Asp Ala Leu Pro Glu Asp His Gly Thr Tyr
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Thr Cys Leu Ala Glu Asn Ala Leu Gly Gln Val Ser Cys Ser Ala Trp
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Ser Asp Leu Lys Val Met Asp Gly Ser Gln Val Thr Met Thr Val Gln
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Val Ser Gly Asn Pro Pro Pro Glu Val Ile Trp Leu His Asn Gly Asn
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Glu Ile Gln Glu Ser Glu Asp Phe His Phe Glu Gln Arg Gly Thr Gln
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His Ser Leu Cys Ile Gln Glu Val Phe Pro Glu Asp Thr Gly Thr Tyr
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Leu Thr Val Gln Glu Pro His Asp Gly Thr Gln Pro Trp Phe Ile Ser
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Lys Pro Arg Ser Val Thr Ala Ser Leu Gly Gln Ser Val Leu Ile Ser
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Cys Ala Ile Ala Gly Asp Pro Phe Pro Thr Val His Trp Leu Arg Asp
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Gly Lys Ala Leu Cys Lys Asp Thr Gly His Phe Glu Val Leu Gln Asn
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Glu Asp Val Phe Thr Leu Val Leu Lys Lys Val Gln Pro Trp His Ala
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Gly Gln Tyr Glu Ile Leu Leu Lys Asn Arg Val Gly Glu Cys Ser Cys
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Gln Val Ser Leu Met Leu Gln Asn Ser Ser Ala Arg Ala Leu Pro Arg
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Gly Arg Glu Pro Ala Ser Cys Glu Asp Leu Cys Gly Gly Gly Val Gly
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Ala Asp Gly Gly Gly Ser Asp Arg Tyr Gly Ser Leu Arg Pro Gly Trp
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Gly Lys Lys Val Ser Thr Lys Thr Leu Ser Glu Asp Asp Leu Lys Glu
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Ile Pro Ala Glu Gln Met Asp Phe Arg Ala Asn Leu Gln Arg Gln Val
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Lys Pro Lys Thr Val Ser Glu Glu Glu Arg Lys Val His Ser Pro Gln
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Gln Val Asp Phe Arg Ser Val Leu Ala Lys Lys Gly Thr Ser Lys Thr
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Pro Val Pro Glu Lys Val Pro Pro Pro Lys Pro Ala Thr Pro Asp Phe
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Arg Ser Val Leu Gly Gly Lys Lys Lys Leu Pro Ala Glu Asn Gly Ser
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Ser Ser Ala Glu Thr Leu Asn Ala Lys Ala Val Glu Ser Ser Lys Pro
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Leu Ser Asn Ala Gln Pro Ser Gly Pro Leu Lys Pro Val Gly Asn Ala
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Lys Pro Ala Glu Thr Leu Lys Pro Met Gly Asn Ala Lys Pro Ala Glu
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Thr Leu Lys Pro Met Gly Asn Ala Lys Pro Asp Glu Asn Leu Lys Ser
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Ala Ser Lys Glu Glu Leu Lys Lys Asp Val Lys Asn Asp Val Asn Cys
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Ser Gln Gly Thr Ala Pro Ala Phe Lys Gln Lys Leu Gln Asp Val
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His Val Ala Glu Gly Lys Lys Leu Leu Leu Gln Cys Gln Val Ser
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Leu Lys Thr Thr Lys Phe Ile Ile Leu Ser Gln Glu Gly Ser Leu
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Cys Ser Val Ser Ile Glu Lys Ala Leu Pro Glu Asp Arg Gly Leu
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Tyr Lys Cys Val Ala Lys Asn Asp Ala Gly Gln Ala Glu Cys Ser
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Cys Gln Val Thr Val Asp Asp Ala Pro Ala Ser Glu Asn Thr Lys
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Ala Pro Glu Met Lys Ser Arg Arg Pro Lys Ser Ser Leu Pro Pro
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Val Leu Gly Thr Glu Ser Asp Ala Thr Val Lys Lys Lys Pro Ala
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Pro Lys Thr Pro Pro Lys Ala Ala Met Pro Pro Gln Ile Ile Gln
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Phe Pro Glu Asp Gln Lys Val Arg Ala Gly Glu Ser Val Glu Leu
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Phe Gly Lys Val Thr Gly Thr Gln Pro Ile Thr Cys Thr Trp Met
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Pro Pro Ala Gly Thr Pro Cys Ala Ser Asp Ile Arg Ser Ser Ser
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Val Gln Ser Tyr Ser Ile Glu Ile Trp Asp Ser Ala Asn Lys Thr
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Trp Lys Glu Leu Ala Thr Cys Arg Ser Thr Ser Phe Asn Val Gln
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Asp Leu Leu Pro Asp His Glu Tyr Lys Phe Arg Val Arg Ala Ile
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Asn Val Tyr Gly Thr Ser Glu Pro Ser Gln Glu Ser Glu Leu Thr
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Tyr Ser Ala Lys Glu Lys Glu Asn Ile Arg Gln Glu Ile Ser Ile
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Gly Gly Glu Leu Phe Glu Arg Ile Ile Asp Glu Asp Phe Glu Leu
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Thr Glu Arg Glu Cys Ile Lys Tyr Met Arg Gln Ile Ser Glu Gly
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Val Glu Tyr Ile His Lys Gln Gly Ile Val His Leu Asp Leu Lys
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Pro Glu Asn Ile Met Cys Val Asn Lys Thr Gly Thr Arg Ile Lys
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Leu Ile Asp Phe Gly Leu Ala Arg Arg Leu Glu Asn Ala Gly Ser
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Ile Asn Tyr Glu Pro Ile Gly Tyr Ala Thr Asp Met Trp Ser Ile
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Gly Val Ile Cys Tyr Ile Leu Val Ser Gly Leu Ser Pro Phe Met
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